IN THE CLAIMS:

Please amend Claims 37, 39, 40, 43, 44, 46, 47 and 49, and cancel Claim 38, as follows.

37. (Currently Amended) An apparatus for processing a semiconductor wafer in a processing chamber, said apparatus comprising:

a gas panel coupled to said processing chamber;

an antenna proximate to said processing chamber;

a power supply coupled to said antenna; and

a controller, coupled to said antenna and said gas panel, said controller containing a computer readable storage medium having program code embodied therein, said program code for controlling the apparatus in accordance with the following:

(a) loading a substrate into a processing chamber having deposits on chamber surfaces which were generated during processing of a previous substrate;

(b) conducting an etch process on said loaded substrate which removes at least a portion of an exposed layer present on said substrate to produce a cleaning material which simultaneously removes at least a portion of said deposits from said chamber surfaces during said etch, wherein in accordance with program code from said readable storage medium, a plasma source gas used to generate an etchant plasma is furnished to said processing chamber via said gas panel, and wherein in accordance with program code from said readable storage medium, said power supplied to generate and maintain said plasma is furnished to said processing chamber by said power supply coupled to said antenna; and

(c) controlling said power supply in accordance with program code from said readable storage medium to provide energy to said antenna proximate to said processing chamber, thereby effecting the removal of said deposits from said chamber surfaces.

38. (Cancelled)

39. (Currently Amended) The apparatus of Claim ~~38~~ 37, wherein said etch process comprises plasma etching a layer of silicon nitride formed on said substrate.

40. (Currently Amended) The apparatus of Claim 39, wherein said plasma source gas supplied in accordance with program code from said readable storage medium comprises a fluorine-containing compound and a bromine-containing compound.

41. (Previously Presented) The apparatus of Claim 40, wherein said fluorine-containing compound is SF_6.

42. (Previously Presented) The apparatus of Claim 40, wherein said bromine-containing compound is HBr.

43. (Currently Amended) The apparatus of Claim 37, wherein said previous substrate comprises silicon, and wherein said processing of said previous substrate comprises plasma etching said silicon substrate, whereby said deposits on said chamber surfaces were generated ~~a portion of said silicon substrate is removed~~.

44. (Currently Amended) The apparatus of Claim 43, wherein plasma etching of said silicon substrate in accordance with program code from said readable storage medium is performed using a plasma source gas comprising a halogen-containing compound and oxygen.

45. (Previously Presented) The apparatus of Claim 44, wherein said halogen-containing compound is HBr.

46. (Currently Amended) The apparatus of Claim 43, wherein said processing of said previous substrate in accordance with program code from said readable storage medium comprises plasma etching an upper portion of a trench in said silicon substrate using a plasma source gas comprising a fluorine-containing compound and oxygen.

47. (Currently Amended) The apparatus of Claim 43, wherein etching of said silicon substrate in accordance with program code from said readable storage medium is performed using a plasma source gas

which includes at least three reactive gases which include at least one fluorine-containing compound which does not contain silicon, at least one silicon-containing compound, and oxygen.

48. (Previously Presented) The apparatus of Claim 47, wherein a volumetric ratio of said at least one fluorine-containing compound which does not contain silicon to said at least one silicon-containing compound ranges from about 100:1 to about 1:10.

49. (Currently Amended) The apparatus of Claim 46, wherein said processing of said previous substrate in accordance with program code from said readable storage medium further comprises plasma etching a lower portion of said trench in said silicon substrate using a plasma source gas which includes at least three reactive gases which include at least one fluorine-containing compound which does not contain silicon, at least one silicon-containing compound, and oxygen.

50. (Previously Presented) The apparatus of Claim 47, wherein said silicon-containing compound is selected from the group consisting of SiF_4, Si_2F_6, $SiHF_3$, SiH_2F_2, SiH_3F, Si_2OF_6, $SiCl_2F_2$, $SiClF_3$, and combinations thereof.

51. (Previously Presented) The apparatus of Claim 49, wherein said silicon-containing compound is selected from the group consisting of SiF_4, Si_2F_6, $SiHF_3$, SiH_2F_2, SiH_3F, Si_2OF_6, $SiCl_2F_2$, $SiClF_3$, and combinations thereof.

52. (Previously Presented) The apparatus of Claim 47, wherein said silicon-containing compound does not contain fluorine and is selected from the group consisting of $SiBr_4$, $SiHBr_3$, SiH_2Br_2, SiH_3Br, $SiCl_4$, $SiHCl_3$, SiH_2Cl_2, SiH_3Cl, Si_2Cl_6, SiH_4, Si_2H_6, Si_3H_8, Si_4H_{10}, $SiHI_2$, SiH_2I, $C_4H_{12}Si$, $Si(C_2H_3O_2)_4$, and combinations thereof.

53. (Previously Presented) The apparatus of Claim 49, wherein said silicon-containing compound does not contain fluorine and is selected from the group consisting of $SiBr_4$, $SiHBr_3$, SiH_2Br_2, SiH_3Br, $SiCl_4$,

$SiHCl_3$, SiH_2Cl_2, SiH_3Cl, Si_2Cl_6, SiH_4, Si_2H_6, Si_3H_8, Si_4H_{10}, $SiHI_2$, SiH_2I, $C_4H_{12}Si$, $Si(C_2H_3O_2)_4$, and combinations thereof.

54. (Previously Presented) The apparatus of Claim 47, wherein said fluorine-containing compound which does not contain silicon is selected from the group consisting of F_2O, F_2O_2, NF_3, NOF, NO_2F, SF_6, SF_4, S_2F_2, S_2F_{10}, CF_4, CH_2F_2, CHF_3, CH_3F, and combinations thereof.

55. (Previously Presented) The apparatus of Claim 49, wherein said fluorine-containing compound which does not contain silicon is selected from the group consisting of F_2O, F_2O_2, NF_3, NOF, NO_2F, SF_6, SF_4, S_2F_2, S_2F_{10}, CF_4, CH_2F_2, CHF_3, CH_3F, and combinations thereof.